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Associations between household responsibilities and academic competencies in the context of education accessibility in Zambia

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Abstract

The relationship between education and socioeconomic status has been demonstrated in studies of the developed and the developing world, yet there are communities in which schooling is either not available to all children or not a preferred activity for all children. In this study, we investigated the differences between children in-school and out-of-school in rural and peri-urban communities of Zambia. As expected, we found that the children in-school performed higher in domains of adaptive behavior and on assessments of academic achievement (i.e., mathematics, reading). Somewhat unexpectedly, however, when controlling for socioeconomic status, home responsibilities (i.e., chores, work) were a positive predictor for the performance of the children out-of-school, but a negative predictor for the children in-school. The relationship between home responsibilities and academic performance may be bidirectional and differential; for example, our findings allow for the hypothesis that for in-school children chores take time away from the studies, but for out-of-school children they provide some limited mathematics exposure.

Keywords

Zambia; education; academic achievement; child labor; adaptive behavior; home responsibilities

Introduction

Education is a well-documented means to improving the overall welfare of both individuals and societies, especially in terms of social, economic and environmental stability. It is a route to higher economic achievement and better health not only for individuals and families, but also for countries on a larger scale (Swallow, Nielson, & Chakufyali, 2009; Wolhuter, 2007; World Bank, 2011). Yet, in parts of the world, namely in parts of sub-Saharan Africa, there are communities and cultures in which education is not available to all children and in which schooling is not the preferred way for all children to spend their days. This is true in Zambia, one of the least developed countries and a place where, in spite of

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economic growth over the last decade, 66% of the population still lives in poverty (Ministry of Finance and National Planning, 2011; USAID, 2011). While a large percentage of children have had some exposure to school, only about 30% of children attend secondary school and the adult literacy rate is about 70% (UNICEF, 2008) with functional literacy rates even lower, under 25% (Johnstone & Mandryk, 2001). Moreover, according to a 2009 report, almost 10% of children aged 9 to 17 have never attended school at all (Aldobrandini, 2009).

Because of financial difficulties and work obligations, families frequently send some, but not all, of their school-aged children to school. They and their children use other means to transmit or ensure the acquisition of the essential knowledge and skills needed to either enter the workforce or work on the family's farm, especially in rural areas. Socioeconomic status (SES) has been linked to education (Coleman, J. et al., 1966, Ermisch & Francesconi, 2001; Glick & Sahn, 2000; Lloyd & Blanc, 1996; Teachman, 1987). Families whose members attain higher education have been shown to have higher SES outcomes; their children, in turn get more schooling compared to their peers in families with lower SES and thus there is a cycle between levels of educational achievement and SES for generations. However, promoting education as the path to higher SES is not always practical. Moreover, the traditional knowledge transmitted through experiences outside of the school setting can be of immediate greater value to these individuals, families, and communities, than the knowledge gained in formal schooling.

More needs to be explored about what alternative approaches to structured school settings can contribute to life success generally and to achievement in academic skills more specifically in the developing world. Past research has considered paths to literacy and general education outside of the school setting, but has mostly focused on the Western world (Hull & Schultz, 2001). It has been established, for instance, that children and youth who work in trading or other occupations that require real-life knowledge of practical mathematical skills can acquire them as they engage in this work (Ibid.). It is also known that traditional African economies can rely heavily on child labor (Admassie, 2002). A 2010 report cited the percentage of children in Zambia who are economically active (be it on the family farm or in other forms of employment) at 14.5% (Ibid.), but the ways in which these children acquire their knowledge (i.e., through formal schooling or somehow else) and how they fare in comparison to their peers who have the opportunity to go to school has not been sufficiently studied.

Further, it is not yet well understood how families who have some children attending school and others not attending school determine who will go to school and who will stay at home. A 2002 survey in Zambia reported that a high percentage of parents and caretakers indicated benefits to completing primary school, but many also indicated problems with buildings and overcrowding (Central Statistical Office [Zambia] & ORC Macro, 2003). Aside from age being a factor in deciding when to let young children start going to school, little is known about how Zambian parents and caretakers make decisions about schooling opportunities for individual children. In the Masai villages of rural Kenya, it has been reported that the children perceived to have more cognitive potential are the ones kept at home while the ones perceived to have less cognitive potential are sent to school ("No Swots, Please, We're Masai," 2002). Why certain children are sent to school while others remain at home, either temporarily or permanently, is understudied in communities in which attending school, or a formal education more generally, is not a societal obligation.

Zambian parents and caretakers seem to believe that education is positive for children's development, but there are still large numbers of primary school-aged children not currently enrolled in academic programs. In this article we investigated the impact of home life

responsibilities (i.e., chores and work) on the reading and mathematics skills of children in-school and out-of-school in order to provide insight into how these markers of academic achievement might be acquired in more organic and everyday life settings and how children provided with schooling may differ from those not given such experiences.

Education in Zambia

The public education system in Zambia is relatively young. It was put in place after Zambia achieved independence less than 50 years ago (Carmody, 2004; Mwanakatwe, 1974), yet the government's dedication to the development of public education has remained consistent. In an effort to promote public education, the government joined the global movement supporting education at the World Conference on Education for All in Thailand in 1990. Since then the Ministry of Education in Zambia has enacted several policies with the intention of improving education nationally in both urban and rural settings. With the Free Basic Education Policy of 2002, Zambia declared its commitment to improve access to and the quality of basic education for students in grades 1–9, and specifically to address issues of accessibility, inclusiveness, equitability, and relevance to individual, national, and global needs (Robson & Kanyanta, 2007; Zambia Ministry of Education, 1996). As part of this effort, Zambia eliminated school fees for basic education through the Basic Education Sub-Sector Investment Programme (BESSIP), which improved access to schooling for many Zambia children (Zambia Ministry of Education, 2003).

However, providing global education for all is a project with many practical hurdles. One of the practical hurdles is getting those who are to be educated to commit to the idea that education has practical value and is not simply an abstract concept with few tangible outcomes. While the ideological value of education may be advertised and supported by policies on a national level, the practical value of education is still underappreciated when it comes to those individuals and families whose traditional upbringing places little emphasis on formal education. Families, especially in rural areas of sub-Saharan Africa, continue to keep children out of the school system due to financial difficulties and home responsibilities, which are seen as more immediate needs. Jensen and Nielsen (1997) surveyed Zambian families and found that financial expense was the number one reason eligible children did not attend school and the second highest reason for why children dropped out of school (the number one reason was not meeting minimum grade-level expectations). The most common reasons reported for why children ages 7–14 had never attended school in a 2002 national survey in Zambia included the cost associated with schooling, the distance between home and school, and the perception that the children were too young (Central Statistical Office [Zambia] & ORC Macro, 2003). For children ages 6–14, who dropped out of school, parents and caretakers most often reported that money, distance, and children's interests in school were the reasons their children no longer attended school.

Not only do families lack the funds to send children to school, but potential revenue is lost when children attend school programs instead of working. Not surprisingly, children who work more complete fewer years of education (Edmonds, 2007; Psacharopoulos, 1997; Ray, 2003; Zabaleta, 2011). Even when children are able to attend school, many must do additional market or domestic work when they are not at school. These responsibilities away from school are shown to seriously impact school attendance. Using the UNICEF's Multiple Indicator Cluster Surveys (MICS) from 2000, Edmonds (2007) assessed school attendance rates and found that they declined with hours of work in instances when children worked more than eight hours a week. Children who spent more hours on work outside of the household had a much greater decline in school attendance compared to those who worked within the household, but whether the work was categorized as being market or domestic work was inconsequential for school attendance.

Further, school attendance is not the only challenge for Zambia's education system. Educational quality and access to resources for the number of students remains problematic as well. The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) reported that as of 2000 nearly half of sixth grade students in their study were reading below the basic reading level and more than half were not yet at the level of basic numeracy (Southern and Eastern Africa Consortium for Monitoring Educational Quality, 2011). Despite school attendance, children are still not mastering basic reading and mathematics skills after multiple years in school. Moreover, a more recent report from SACMEQ reported that approximately 40% of sixth grade students in Zambia do not have at least one of the following: an exercise book, a pencil/pen, a ruler (Kaba & Musonda, 2011). This study also found that most sixth grade students do not have their own mathematics textbook or are able to share with just one other student, and that class sizes remain large – at 46 students on average in the sixth grade.

Along with the effect on a child's presence in school and the quality of that schooling, work and chores also impact academic achievement. Studies from several developing countries, including Tanzania and Ghana found that hours of work were negatively correlated with reading and mathematical skills (Akabayashi & Psacharopoulos, 1999; Heady, 2003). The academic competencies of those who are not enrolled in school, namely skills associated with reading and mathematics, are often left out of studies of the social and economic effects on children in the developing world. This study aims to identify differences between children in-school and out-of-school related to their home life and its impact on academic achievement through assessments of adaptive behavior, the number of chores completed, SES, reading, and mathematics. We expect that the two groups of children will differ in their reading and mathematical competencies because the children in-school at the time of the study were receiving direct instruction whereas the children out-of-school were not provided with such opportunities. Differences in the way adaptive behavior, SES, and home life responsibilities (i.e., chores) are related to academic achievement provide new insight into the value of education for many Zambian families.

Method

Participants

The participants were from a larger epidemiological survey on learning disabilities in Zambia. In this particular study, given the patterns of missing data[1], we selected a subsample with no missing data on any of the variables used in the analysis. This resulted in selection of 55.38% (N = 922) of the total number of children approached (N = 1665). Although there were differences on some of the variables between this subsample and the subsample not included in this study (i.e., demographics or performance indicators), no systematic bias could be detected.

The 922 participants (484 male, 438 female) of this study were children between ages 6 and 18 (M = 11.98 years, SD = 2.99 years) from rural and peri-urban parts of Eastern Province, Zambia. Table 1 shows the breakdown of the sample with regard to children in-school vs. out-of-school at the time of the study, peri-urban vs. rural, and male vs. female. There was no relationship in the number of children in and out of school in terms of whether they came from urban or rural areas (χ^2 (1) = 3.65, p = .06, Cramer's V = .06, p = .06). However, there was a significant relationship in the number of females and males with regard to in and out of school status (χ^2 (1) = 12.61, p < .01, Cramer's V = .12, p < .01), with more females attending school at the time of the study.

[1]Although it is possible to use imputation methods to treat missing values, they have not been explored in this paper.

The children in-school were selected for participation at random with a relatively even distribution from grades two to six of 16 local government schools. The children out-of-school were selected in equal numbers at random from the same communities. Life in the peri-urban and rural areas is expectedly different, with subsistence farming central to daily life in rural Zambian communities and town activities more common in urban and peri-urban communities. For children in-school, the data showed a substantial discrepancy between the children's age and the age that would be expected for their grade. The children were on average 1.86 years (*SD* = 1.81 years) older than what would be the expected age for their grade (ranging from 2 years younger than expected to 9 years older than expected) based on the Zambian school-entry age of 7. Furthermore, a total of 21.2% of the children in-school had repeated a grade (compared to 6.6% of the children out-of-school).

From the children who were out of school at the time of the study, a total of 54.2% had been to school at some point in their lives at least once. The majority (74.4%) of these children had completed between one and four grades. With regard to the reason for their current out-of-school status, 49.1% reported financial difficulties, 16% had work obligations, 9.2% reported no specific reason, 5% had family obligations, 8.1% had not reached the minimum age for enrollment, and 12.1% reported various other difficulties, such as long distances to the nearest school, poor performance by teachers, and waiting to be placed into a new school after relocating.

Materials

Zambian Achievement Test (ZAT)—The ZAT is an assessment developed by the EGLab at Yale University and colleagues at the University of Zambia (UNZA) (Stemler et al., 2009). It is based on the curricula of Zambia and is designed to be administered individually to children in primary school. The version used in this study had four subtests: Reading Recognition, Reading Comprehension, Pseudoword Reading, and Mathematics. For our analyses, we focused on three of the subtests and did not include Pseudoword Reading. Sum scores of each subtest were the outcome measures of this study.

Mathematics (ZAT-M): ZAT-M has 60 multiple-choice items that increase in difficulty and cover a variety of mathematical concepts such as number recognition, counting, arithmetic, geometry, and measurement.

Reading Comprehension (ZAT-RC): ZAR-RC has 24 items that require the children to read directions of increasing difficulty and respond to them by completing the actions described in the directions. For example, the sixth most difficult item is "Scratch your chin".

Reading Recognition (ZAT-RR): ZAT-RR has 120 multiple-choice items. Forty of them are related to pre-reading skills of alphabet knowledge and phonological awareness. The remaining 80 items require the children to read aloud words of increasing length and decreasing frequency.

Vineland Adaptive Behavior Scales, Second Edition (Sparrow, Cicchetti, & Balla, 2005)—The Vineland-II assesses adaptive behavior through semi-structured interviews with teachers and parents. Parent interviews are conducted one-on-one, while teachers fill out questionnaires. Importantly, the Vineland-II is designed to capture the behavior that children *actually produce* to function throughout the day, rather than behaviors a child *can* produce. The Vineland-II measures communication skills (receptive, expressive, and written), daily living skills (self-care, helping around the home, and community skills), social skills (interpersonal relationships, play and leisure time skills, and coping skills), and motor skills (gross and fine). The data included in this study were from parent interviews

and the domains included in the analyses were communication (COMM) and daily living skills (DLS). The COMM subscales included a total of 99 items and the DLS subscales included a total of 109 items. All items were answered on a scale of *zero* (never performing the behavior or never performing the behavior independently), *one* (sometimes performing the behavior independently or partially performing the behavior independently), and *two* (usually performing the behavior independently, without physical help or reminders).

Demographic Questionnaire—Each child was asked a set of questions on topics of SES, home life, language knowledge and usage, home responsibilities, and school. These questionnaires were developed for use in Zambia based on previous research and clinical experience relevant to child development and learning disorders in sub-Saharan Africa and in consultation with native speakers of Chinyanja and local professionals (Stemler et al., 2009).

The questions were administered through in-person interviews by trained data collectors. The questions regarding the SES of the participants included in this study were: (1) *Do you have books in your home?*, (2) *Is there running water inside your home?*, (3) *Which of the following do you own: (3a) television, (3b) stove, (3c) refrigerator/freezer, (3d) telephone (not cellular)?*. All questions had to be answered with *Yes* (1) or *No* (0). A sum score was used for further analyses, such that higher values reflected a higher SES. The number of chores was assessed by analyzing the following questions: (1) *What are your responsibilities at home?*, (2) *What are your responsibilities away from home?* The following responses were included in this study: (1) *Serve food to elders*, (2) *Look after children*, (3) *Look after a sick person*, (4) *Sell goods*, (5) *Prepare meals*. These chores were selected because, based on interviews with a sample of Zambian adults, they appeared to be the more complex chores found in daily Zambian life. Even though complexity could not be directly assessed, the chores in this study required a reasonable amount of interpersonal communication, analytical ability, and academic skills (i.e., reading, mathematics). For example, caring for a sick person required interacting with the person, analyzing the level of sickness, and making care decisions accordingly, while washing dishes, for example, would generally require only rote, repetitive activity. Children responded to the chores questions with either *Yes* (1) or *No* (0). The computer software M*plus* Version 6.11 (Muthén & Muthén, 1998–2010) was used to conduct a confirmatory factor analysis that utilized a robust maximum likelihood estimator (WLSMV) in order to confirm the one-factor solution of the observed categorical chores indicators. Results yielded a good fit of a general latent factor underlying these five chores to the data (see Hu & Bentler, 1999, for acceptable cut-offs of the fit indices): χ^2 (*df* = 5) = 16.49, $p < .01$, RMSEA (90%-CI) = .05 (.025 – .078), *p*RMSEA ≤ .05 = .451, CFI = .984, TLI = .968, WRMR = .885. Based on the confirmation of a general factor model, a sum score was used for further analyses, such that higher values reflected a higher level of home responsibilities for the children.

Procedure and Data Analyses

Institutional Review Boards at Yale University and the University of Zambia approved the data collection procedures and consents were collected for all participants. In the second school terms of 2004 and 2005 trained Zambian data collectors administered the assessments individually at separate stations. The children's responses were either verbal or required pointing to a multiple-choice selection. The data collectors recorded all responses. The assessments and questionnaires were available in English, one of the official languages of Zambia, and Chinyanja (or Nyanja), the local Bantu language, spoken by more than 800,000 people in Zambia (Lewis, 2009). Very few children met the criteria to be assessed in English; thus, all participants in this sample were assessed in Nyanja. The Vineland-II was only completed with caretakers for 265 of the participants included in this study.

Hierarchical regression analyses were used to test whether chores and the SES of the children predicted academic outcomes over and above the demographic variables for both children in-school and out-of-school. We conducted three hierarchical regression analyses (one for each domain of academic performance) separately for children in-school and out-of-school. For children in-school, demographic and control variables such as urban vs. rural status, gender, and age were entered at step 1 (Model 1), while the chore as well as SES scores were entered at step 2 (Model 2). Even though the relationship between SES and academic achievement is potentially bidirectional, we were mainly interested in the contribution of home responsibilities (chores) in explaining variance in academic achievement over and above the effect of SES. For that reason, we included both composites as independent variables in Model 2. For children out-of-school, we included the number of grades completed as an additional covariate in Model 1. Age, SES and chores were centered at their means before entering them as predictors.

Results

Table 2 shows descriptive statistics and internal consistencies for the study variables. With regard to gender, females scored higher than males in SES ($t(874.07) = 2.65$, $p = .008$), chores ($t(917) = 8.80$, $p = .000$) as well as in communication skills ($t(263) = 2.08$, $p = .038$) and daily living skills ($t(256.63) = 3.24$, $p < .01$). There were no gender differences with regard to the other variables (all t-values ranged between −1.16 and 0.25). With regard to urban vs. rural location, children in urban areas showed higher levels of SES ($t(478.29) = 8.96$, $p = .000$) as well as chores ($t(917) = 3.00$, $p = .003$) compared to children in rural areas. With regard to in-school vs. out-of-school status, children in-school showed significantly higher levels in all variables (all t-values ranged between 3.17 and 11.05, all ps $< .01$).

Table 3 shows zero-order correlations between the main variables. These results showed that all three academic outcomes were positively related to SES and children's chores (though the correlations were small in magnitude), the children's ages, and the adaptive behavior variables (COMM and DLS). However, SES was only weakly related to the number of chores, not related to communication or daily living skills, and negatively related to age. Finally, children's chores were positively related to their level of adaptive communication and, with a higher magnitude, to their daily living skills. The low to moderate intercorrelations among the independent variables of interest for the regression models (age, chores, and SES) range between .06 and .43, indicating no concerns in terms of multi-collinearity among the predictors.

Predictors of academic outcomes

Table 4 shows the results of multiple regression analyses for in-school children. In this group, the variance inflation factors (VIF) for predictors ranged between 1.11 and 1.78 (Tolerance ranged between .56 and .90), indicating no biased results due to multi-collinearity. With regard to children in-school, the only significant predictor added to Model 2 was the chores score, and it applied only to mathematics performance (see Table 4). The negative regression weight ($\beta = -.10$, $p < .05$) indicates that for children who attend the school, a higher number of chores is related to lower mathematics test scores. Adding the second set of predictors in Model 2 did not account for a significant increase in explained variance of mathematics, reading recognition or reading comprehension. SES was not significantly related to any of the three domains of academic performance for in-school children over and above the demographic and control variables.

In contrast, Table 5 shows three two-step hierarchical regressions (Models 1 and 2) for out-school children and the prediction of scores in mathematics, reading comprehension, and

reading recognition. In this group, the variance inflation factors (VIF) for predictors ranged between 1.07 and 1.78 (Tolerance ranged between .56 and .93), indicating no concern with multi-collinearity. SES was found to be a significant predictor of all three domains of academic outcomes over and above the demographic and control variables. The number of chores was only a positive predictor for mathematics ($\beta = .10$, $p < .05$), but not for reading recognition ($\beta = -.07$, $p = .17$) or reading comprehension ($\beta = -.02$, $p = .75$).

To sum up, mathematics, reading comprehension, and reading recognition were a function of SES only for children out-of-school, but not for children in-school. Interestingly, child chores revealed to be a negative predictor of mathematic performance for children in-school, but a positive predictor for children out-of-school. Child chores were not predictive of scores in reading recognition or reading comprehension for children in and out of school. These results indicated that SES was not specifically related to a certain academic domain but mathematics was the only academic domain for which chores was a significant predictor. Moreover, although chores are a predictor of mathematics performance in our analysis, their relationship is potentially bidirectional. It is possible that parents and caretakers make decisions about chores assignment based on competencies related to academic performance.

Discussion

Our sample provides a compelling case for studying the interactions between economic development and education. As indicated in the introduction, there is a well-supported relationship between educational achievement and SES (Ermisch & Francesconi, 2001; Glick & Sahn, 2000; Lloyd & Blanc, 1996; Teachman, 1987). However, these links might not be as straightforward for some communities. Moreover, the value of education itself might be conceived of differently in different geographical locales. While the Zambian government purports that school education is free for all since the government does not charge fees (Zambia Ministry of Education, 2003), there were still other expenses associated with school attendance (e.g., school uniforms, supplies) that amounted to significant costs of sending a child to school at the time the data were collected. In addition, some families in this study appear to view their children's time in school and away from home responsibilities as an imprudent investment, as has been found in previous studies (Jensen & Nielsen, 1997). The impact of sending children to school is substantial and can affect parents' and caretakers' willingness to send children to school. Given these and other factors, not all children in Zambia attend school (UNICEF, 2008). Even though many families send some of their children to school and keep some home, and many of the children who were out of school at the time of this study had some education previously, there was a measurable difference between the two groups of children.

As expected, the two groups of children differed in their mathematics and reading skills, but interestingly, they also differed in their scores on the communication and daily living skills domains, as assessed by the Vineland-II, and by the number of chores for which they were responsible. The higher scores on the Vineland-II communication domain were a reflection of the scales that include assessments of written expression. The higher daily living skills score for in-school children, reflecting skills (presumably) less related to formal academics, appears to indicate that in this sample, parents were sending their more capable students to school. Further, a similar correlation between the three academic variables and daily living skills for in-school and out-of-school children suggests that this higher level of adaptive functioning was serving to enhance learning in both environments—formal education and out-of-school chores. A possible hypothesis regarding chores is that the children who were not attending school were out of school because they had home obligations or that their time was being filled with other activities such as was the case for the Masai of rural Kenya ("No

Swots, Please, We're Masai," 2002). That, however, was not observed in the findings of this study. Instead, the children attending school reported that they had a greater number of complex home responsibilities than the children who were not currently attending school. Again, this suggests that in our sample the more capable children were being sent to school; parents are more likely to assign more complex responsibilities to the children they perceive to be more competent, as has been found in previous studies (Guberman, 1996).

The number of chores was a predictor of mathematics in our analysis, but the direction of this prediction differs in the two groups of children. As expected, performance on the mathematics assessment was lower for children who were out of school at the time the data were collected. However, in this group, additional chores were related to better math achievement. For these children, having variety in the chores that they do provided them with a richer range of experiences in which they could practice and build upon their mathematics skills. This was not observed in the children attending school. For them, the greater the number of chores they completed, the lower their scores on the ZAT-M. These children had direct mathematics instruction in the school setting and did not gain as much value from their experiences outside of the school setting. Again, it is possible that the relationship between chores and mathematics is bidirectional, but opportunities to develop mathematical skills outside of a formal education setting as well as differences in development of these skills dependent on the learning environment (i.e., formal schooling, work and chores) have been documented in previous studies, such as those from Brazil (Carraher, Carraher, & Schliemann, 1985; Guberman, 1996). The current study's finding that the same experiences could serve as a positive predictor of mathematical skills for some children (i.e., those out of school), but a negative predictor for others (i.e., those currently in school) is a reflection that the relationship between home responsibilities and the development of mathematical skills is also impacted by other factors. In addition, the level of mathematics that was supported by doing chores was likely at the lower level assessed on the ZAT-M: questions regarding counting, addition and subtraction, and perhaps measurement. In contrast, children in-school were likely learning more formal, higher-level math concepts and procedures. However, the generalizability of these findings is limited in two ways. First, even through the chores clustered together as a one-factor solution, the rather moderate internal consistency might (at least partly) explain the finding that the chores were only related to scores in mathematics, but not to reading recognition and reading comprehension. Second, the resources to conduct research in this part of the developing world were limited. Because of that, we were not able to assess the potential complexity of chores with extensive rating scales and based on self- and other-report. However, this study provides the first evidence of the relationship between home responsibilities and academic outcomes in a rather understudied population.

The fact that the children in-school were also those completing a greater variety of chores could be interpreted as a sign of being perceived by their parents to be of greater cognitive ability or higher adaptive functioning than their siblings. More studies are needed on the complexities of how parents from communities such as those of Zambia choose which children to send to school and which to keep home, and how these decisions change as families and children grow and change.

Conclusion

This study is only a small step toward understanding the role that formal education plays in Zambia and other traditional societies. A relatively young country, Zambia is committed to attaining the Millennium Development Goals of primary education for all. As the Zambian Ministry of Education attempts to promote wider access to education, it is important to understand how this effort will affect a society in which formal education is not part of its

rich history and tradition, how to work with families towards this goal, and perhaps even how children not currently enrolled in formal education programs are able to develop academic competencies outside of formal educational contexts.

Through improving educational opportunities and the quality of education available for children in Zambia, SES could be improved for the country, its communities, and individuals. However, we must ask how traditional values will change, and how the economy and educational system might continue to influence and transform each other as the new generation of Zambians enters the labor force. Many of the children reported that they were not in school because of financial difficulties, and perhaps if Zambia as a country can reduce the financial burden of attending school, more children will have the opportunity to do so. However, family obligations such as pregnancy, looking after other family members, and helping at home will continue to be a barrier to education for a large number of children and adolescents. Programs for young mothers and pre-school programs could aid families and afford more children with school access. Less common reasons for not attending school, but not less remarkable, were reports that school was not of value. School must be perceived as being a valuable investment, and must actually be a valuable investment, in order for formal education to be marketable to families. Thus, high quality educational opportunities that are relevant to people's everyday lives needs are essential. This could include curriculum changes in order to better connect formal schooling with traditional life or accessible evidence of the benefits of schooling for the children and their families.

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Table 1

Sample breakdown by in- vs. out-of-school status, peri-urban vs. rural location, and gender

	In-School (*n* = 495)	Out-of-School (*n* = 427)	Total	χ^2	M_{Age} (*SD*) in years
Location				3.65	
Peri-Urban	167	170	337		11.66 (2.71)
Rural	328	257	585		12.17 (3.13)
Gender				12.61**	
Female	262	176	438		11.79 (2.86)
Male	233	251	484		12.16 (3.10)
Grades completed				114.33**	
1st	56	44	100		10.46 (3.70)
2nd	97	47	144		9.47 (1.72)
3rd	101	49	150		10.70 (1.76)
4th	120	24	144		11.83 (1.85)
5th	111	16	127		13.16 (1.73)
6th	3	18	21		14.02 (1.91)
7th	-	10	10		-
8th	-	4	4		-
9th	-	5	5		-
Repeated a grade	21.2%	6.6%	16.6%		-

Notes. The numbers for completed grades refer to the sub-sample of children who were out of school at the time of the study, but have been to school at least once in their life. Numbers that do not add up to the full sample size result from missing information. χ^2 = Chi-Square value for testing for group differences between in- and out-school children regarding location, gender, and grades completed, respectively. The average age for children in school was 12.00 years (*SD* = 2.39 years), the average age for children out of school was 11.96 years (*SD* = 3.57 years).

** Indicates significant differences between groups at $p < .01$.

Table 2

Descriptive statistics for the main variables

	Total *M* (*SD*)	In-School *M* (*SD*)	Out-School *M* (*SD*)	*t*	*df*	*p*	Urban *M* (*SD*)	Rural *M* (*SD*)	*t*	*df*	*p*	Male *M* (*SD*)	Female *M* (*SD*)	*t*	*df*	*p*	α
Mathematics	28.35 (9.28)	30.81 (9.66)	25.49 (7.92)	9.19	917.68	.000	28.21 (9.67)	28.43 (9.05)	−0.34	920	.73	28.27 (9.28)	28.43 (9.29)	0.25	920	.80	.87
RC	2.81 (6.23)	4.35 (7.32)	1.02 (3.99)	8.73	784.46	.000	3.07 (6.33)	2.65 (6.18)	0.98	920	.33	3.03 (6.39)	2.55 (6.05)	−1.16	920	.25	.98
RR	38.94 (30.81)	47.64 (35.01)	28.86 (21.00)	10.03	825.49	.000	40.42 (31.71)	38.09 (30.27)	1.11	920	.27	39.49 (31.24)	38.34 (30.35)	−0.56	920	.58	.99
Chores	2.56 (1.38)	2.72 (1.38)	2.36 (1.36)	4.01	917	.000	2.73 (1.37)	2.45 (1.38)	3.00	917	.003	2.19 (1.35)	2.96 (1.29	8.80	917	.000	.56
SES	1.36 (1.22)	1.74 (1.41)	0.93 (0.77)	11.05	786.15	.000	1.88 (1.51)	1.07 (0.90)	8.96	478.29	.000	1.26 (1.14)	1.47 (1.30	2.65	874.07	.008	.61
COMM	149.54 (37.68)	156.97 (35.65)	134.85 (37.48)	4.61	169.12	.000	148.21 (38.78)	150.23 (37.20)	−0.41	263	.68	144.81 (41.07)	154.39 (33.33)	2.08	263	.038	.95
DLS	147.88 (37.13)	153.52 (31.17)	136.72 (44.87)	3.17	132.25	.000	149.24 (36.04)	147.17 (37.76)	0.43	263	.66	140.72 (39.59)	155.20 (33.00	3.24	256.63	.001	.96

Notes. RC = Reading comprehension. RR = Reading recognition. SES = Socio-economic status. COMM = Sum score of the communication subscales of the Vineland Adaptive Behavior Scales-II. DLS = Sum score of the daily living skills subscales of the Vineland Adaptive Behavior Scales-II. α = Cronbach's Alpha.

Table 3

Zero-order correlations for the full sample

	1.	2.	3.	4.	5.	6.	7.
1. Mathematics	-	.46**	.49**	.11**	.10**	.33**	.29**
2. RC		-	.88**	.14**	.09**	.35**	.24**
3. RR			-	.15**	.08*	.38**	.26**
4. SES				-	.07*	.06	.11
5. Chores					-	.16*	.29**
6. COMM						-	.52**
7. DLS							-
Age	.30**	.26**	.28**	-.11**	.27**	.23**	.43**

Notes. RC = Reading comprehension. RR = Reading recognition. SES = Socio-economic status. COMM = Sum score of the communication subscales of the Vineland Adaptive Behavior Scales-II. DLS = Sum score of the daily living skills subscales of the Vineland Adaptive Behavior Scales-II.

* $p < .05$ (two-tailed).

** $p < .01$ (two-tailed).

Table 4

Hierarchical Regression Analyses for Variables Predicting Academic Outcomes of In-School-Children

	Mathematics			Reading Comprehension			Reading Recognition		
Variable	***B***	***SE B***	**β**	***B***	***SE B***	**β**	***B***	***SE B***	**β**
Model 1									
Urban/Rural	−0.01	0.91	−.00	−1.75	0.67	−.11**	−8.78	3.21	−.12**
Gender	−0.32	0.84	−.02	0.87	0.62	.06	2.54	2.95	.04
Age	1.75	0.68	.14**	1.91	0.50	.21**	7.99	2.39	.18**
# GC	1.31	0.38	.19**	1.07	0.28	.20**	5.64	1.35	.22**
Model 2									
Urban/Rural	−0.26	0.73	−.01	−1.43	0.74	−.09	−8.07	3.55	−.11*
Gender	−0.90	0.74	−.05	0.88	0.65	.06	2.00	3.10	.03
Age	1.96	0.39	.16**	2.03	0.51	.22**	8.56	2.46	.20**
# GC	1.30	0.20	.19**	1.02	0.29	.19**	5.49	1.37	.22**
SES	0.01	0.57	.00	0.34	0.31	.05	1.02	1.47	.03
Chores	−0.10	0.41	−.10*	−0.05	0.33	−.01	−1.13	1.57	−.03

Notes. SES = Socio-economic status. SE = Standard error. Female was coded as 0, Male was coded at 1. Urban was coded as 0, Rural was coded as 1.

GC = Number of grades completed before dropping out of school. Results for mathematics: Model 1 R^2 = .089, *F (4, 489)* = 11.94, $p < .01$, Model 2: *F (6, 487)* = 8.86, $p < .01$, ΔR^2 = .009, *F for* ΔR^2 = 2.55. Results for reading comprehension: Model 1 R^2 = .142, *F (4, 489)* = 20.17, $p < .01$, Model 2: *F (6, 487)* = 13.63, $p < .01$, ΔR^2 = .002, *F for* ΔR^2 = 0.63. Results for reading recognition: Model 1 R^2 = .138, *F (4, 489)* = 19.62, $p < .01$, Model 2: *F (6, 487)* = 13.23, $p < .01$, ΔR^2 = .002, *F for* ΔR^2 = 0.52.

* $p < .05$ (two-tailed).

** $p < .01$ (two-tailed).

Table 5

Hierarchical Regression Analyses for Variables Predicting Academic Outcomes of Out-School-Children

	Mathematics			Reading Comprehension			Reading Recognition		
Variable	***B***	***SE B***	**β**	***B***	***SE B***	**β**	***B***	***SE B***	**β**
Model 1									
Urban/Rural	−0.65	0.71	−.04	0.04	0.36	.01	0.10	1.87	.00
Gender	1.18	0.71	.07	0.87	0.36	.11*	4.29	1.86	.10*
Age	1.64	0.36	.25**	0.23	0.18	.07	2.07	0.95	.12*
# GC	0.87	0.20	.24**	0.70	0.10	.38**	3.66	0.52	.38**
Model 2									
Urban/Rural	−0.12	0.73	−.01	0.20	0.37	.03	0.75	1.91	.02
Gender	1.63	0.74	.10*	0.84	0.38	.10*	3.46	1.94	.08
Age	1.42	0.39	.21**	0.28	0.20	.08	2.72	1.01	.15**
# GC	0.82	0.20	.22**	0.69	0.10	.37**	3.60	0.52	.37**
SES	1.26	0.57	.10*	0.64	0.29	.10*	3.43	1.49	.10*
Chores	0.83	0.41	.10*	−0.07	0.21	−.02	−1.48	1.07	−.07

Notes. SES = Socio-economic status. SE = Standard error. Female was coded as 0, Male was coded at 1. Urban was coded as 0, Rural was coded as 1.

#GC = Number of grades completed before dropping out of school. Results for mathematics: Model 1 R^2 = .196, *F (4, 420)* = 25.52, $p < .01$, Model 2: *F (6, 418)* = 19.01, $p < .01$, ΔR^2 = .019, *F for* ΔR^2 = 5.01, $p < .01$. Results for reading comprehension: Model 1 R^2 = .192, *F (4, 420)* = 24.99, $p < .01$, Model 2: *F (6, 418)* = 17.59, $p < .01$, ΔR^2 = .009, *F for* ΔR^2 = 2.45. Results for reading recognition: Model 1 R^2 = .217, *F (4, 420)* = 29.14, $p < .01$, Model 2: *F (6, 418)* = 20.76, $p < .01$, ΔR^2 = .012, *F for* ΔR^2 = 3.34, $p < .05$.

*$p < .05$ (two-tailed).

**$p < .01$ (two-tailed)